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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Hiromi INAGAKI
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Group Art Unit:	3657
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Examiner:	Nguyen, Xuan Lan T.
Title:	AUTOMATIC PARKING BRAKE DEVICE

OK TO ENTER: /XLN/

11/02/2010

AMENDMENT-C UNDER 37 CFR 1.116

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the final Office Action dated 29 July 2010, applicant submits the following response:

Amendments to the Claims are reflected in the claim listing which begins on page 2 of this paper.

Remarks and Discussion begin on page 9 of this paper.

IN THE CLAIMS

Please amend the claims as set out in the following claim listing, in which insertions are indicated by underline and deletions are indicated with strikethrough or by double brackets. This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) An automatic parking brake system, comprising:

a casing having a slide bore formed therein, said slide bore including an enlarged diameter portion, a reduced diameter portion, and a ramped annular latching step interconnecting the enlarged diameter portion with the reduced diameter portion;

a parking piston which is slidably fitted into the slide bore of the casing, wherein the casing has a parking control fluid pressure chamber defined therein between a rear face of the parking piston and the casing, said parking piston configured and arranged ~~[[so]]~~ such that a parking brake state ~~can~~ be is obtained by forward movement thereof in response to a parking control fluid pressure acting on the parking control fluid pressure chamber;

a lock mechanism having a lock piston which is slidably fitted into the casing ~~so as to be capable of advancing or retreating~~, said lock piston being operable to advance or retreat relative to the parking piston, wherein said lock mechanism has a parking release control fluid pressure chamber defined therein between a front face of the lock piston and the casing, and said lock piston is urged forward by a spring, said lock mechanism further comprising:

a cylindrical retaining tube integrally and coaxially connected to a rear part of the parking piston and having a hollow bore formed therein;

a plurality of spheres retained at a plurality of positions in the peripheral direction of the retaining tube ~~[[so]]~~ such that the spheres ~~[[can]]~~ move along the radial direction of the retaining tube; and

an insertion shaft inserted into the retaining tube, ~~so that~~ the insertion shaft ~~[[can]]~~ is operable to move axially relative to the retaining tube, said insertion shaft connected integrally to the front end of the lock piston so as to be such that said insertion shaft is in contact with the spheres from the inside of the retaining tube;

wherein the lock mechanism is configured and arranged to automatically lock in response to forward movement of the parking piston in order to mechanically lock the parking piston at a forward position, and to unlock in response to a parking release control fluid pressure acting on the parking release control fluid pressure chamber;

a fluid pressure source; and

a fluid pressure control mechanism for controlling a fluid pressure generated by the fluid pressure source ~~[[so]]~~ such that the parking control fluid pressure and the parking release control fluid pressure ~~can be~~ are obtained and separately controlled;

wherein the insertion shaft is formed by coaxially and integrally connecting a front small diameter shaft portion and a rear large diameter shaft portion via a tapered step, ~~that is capable of changing~~ which is operable to change the position of contact of each of the spheres between the small diameter shaft portion and the large diameter shaft portion;

the small diameter shaft portion being in contact with each of the spheres ~~so as to be capable of~~ for putting each of the spheres in rolling contact with an inner face of the small diameter hole portion in a state in which the parking piston is at a retreat limit, and

the large diameter shaft portion being connected coaxially to the small diameter shaft portion ~~so as to be capable of~~ for pushing each of the spheres outward along the radial direction of the retaining tube in order to make the spheres contact the large diameter hole portion in response to the parking piston moving forward from the retreat limit and the lock piston moving forward.

2. (Currently Amended) An automatic parking brake system, comprising:

a casing having a slide bore formed therein;

a parking piston which is slidably fitted into the slide bore of the casing, wherein the casing has a parking control fluid pressure chamber defined therein between a rear face of the parking piston and the casing, said parking piston configured and arranged ~~[[so]]~~ such that a parking brake state ~~can be~~ is obtained by forward movement of the parking piston in response to a parking control fluid pressure acting on the parking control fluid pressure chamber;

a lock mechanism having a lock piston which is slidably fitted into the casing ~~so as to be capable of advancing or retreating~~, said lock piston being operable to advance or retreat relative to the parking piston, wherein said lock mechanism has a parking release control fluid pressure chamber defined therein between a front face of the lock piston and the casing, and said lock piston is urged forward by a spring, wherein the lock mechanism is configured and arranged to automatically lock in response to forward movement of the parking piston in order to mechanically lock the parking piston at a forward position and to unlock in response to a parking release control fluid pressure acting on the parking release control fluid pressure chamber;

a fluid pressure source; and

a fluid pressure control mechanism for controlling a fluid pressure generated by the fluid pressure source ~~[[so]]~~ such that the parking control fluid pressure and the parking release control fluid pressure ~~can be~~ are obtained and separately controlled;

wherein:

the lock piston of the lock mechanism is positioned at the rear side of the parking piston ~~[[so]]~~ such that a forward urging force acts on the lock piston at least when the parking piston moves forward, and is provided ~~so as to~~ for allowing a parking release control pressure to ~~be made to~~ act on the lock piston toward the rear,

and the lock mechanism further comprises:

a cylindrical retaining tube integrally and coaxially connected to a rear part of the parking piston;

a plurality of spheres retained at a plurality of positions in the peripheral direction of the retaining tube ~~[[so]]~~ such that the spheres ~~[[can]]~~ move along the radial direction of the retaining tube; and

an insertion shaft inserted into the retaining tube ~~[[so]]~~ such that the insertion shaft ~~[[can]]~~ moves axially relative to the retaining tube, said insertion shaft connected integrally to the front end of the lock piston ~~so as to be~~ for being in contact with the spheres from the inside of the retaining tube;

wherein the casing has a large diameter hole portion formed therein having a larger diameter than that of the retaining tube, and a small diameter hole portion being formed on an inner face thereof between the parking piston and the lock piston ~~[[so]]~~ such that a forward-facing annular latching step is interposed between the large diameter hole portion and the small diameter hole portion, the small diameter hole portion being formed ~~so as to have~~ with a smaller diameter than that of the large diameter hole portion, configured to slidably receive the retaining tube therein, and being disposed to the rear of the large diameter hole portion; and

wherein the insertion shaft is formed by coaxially and integrally connecting a front small diameter shaft portion and a rear large diameter shaft portion via a tapered step ~~that is capable of changing,~~ which is configured to change the position of contact of each of the spheres between the small diameter shaft portion and the large diameter shaft portion;

the small diameter shaft portion being in contact with each of the spheres ~~so as to be capable of~~ for putting each of the spheres in rolling contact with an inner face of the small diameter hole portion in a state in which the parking piston is at a retreat limit, and the large diameter shaft portion

being connected coaxially to the small diameter shaft portion ~~so as to be capable of~~ for pushing each of the spheres outward along the radial direction of the retaining tube in order to make the spheres contact the large diameter hole portion in response to the parking piston moving forward from the retreat limit and the lock piston moving forward.

3. (Currently Amended) The automatic parking brake system according to either Claim 1 or Claim 2, further comprising a brake caliper having an adjustment mechanism provided therein, said brake caliper having a brake fluid pressure chamber formed therein, a brake piston being slidably fitted into a cylinder hole of the brake caliper and having a rear face facing the brake fluid pressure chamber,

the adjustment mechanism comprising:

an adjustment nut connected to the brake piston ~~[[so]]~~ such that relative rotation is not possible and housed in the brake fluid pressure chamber, an adjustment bolt having a front end part screwed into the adjustment nut, a relay piston disposed in a rear part of the brake fluid pressure chamber and slidably fitted into the brake caliper in a liquid-tight manner ~~[[so]]~~ such that the relay piston cannot rotate around the axis but ~~[[can]]~~ moves in the axial direction, and a small piston integrally and coaxially connected to a rear part of the adjustment bolt, slidably fitted into the relay piston in a liquid-tight manner, and resiliently urged in a direction in which the small piston frictionally engages with the relay piston, the parking piston abutting against the relay piston from the rear side and being slidably fitted into the casing connected to the brake caliper and the lock mechanism being provided within the casing to the rear side of the parking piston.

4. (Currently amended) An automatic parking brake system, comprising:

a casing having a slide bore formed therein;

a parking piston which is slidably fitted into the slide bore of the casing, wherein the casing has a parking control fluid pressure chamber defined therein between a rear face of the parking piston and the casing, said parking piston configured and arranged ~~[[so]]~~ such that a parking brake state ~~can be~~ is obtained by forward movement of the parking piston in response to a parking control fluid pressure acting on the parking control fluid pressure chamber;

a lock mechanism having a lock piston which is slidably fitted into the casing ~~so as to be capable of advancing or retreating~~, said lock piston being operable to advance or retreat relative to the parking piston, wherein said lock mechanism has a parking release control fluid pressure chamber defined therein between a front face of the lock piston and the casing, and said lock piston is urged forward by a spring, wherein the lock mechanism is configured and arranged to automatically lock in response to forward movement of the parking piston in order to mechanically lock the parking piston at a forward position and to unlock in response to a parking release control fluid pressure acting on the parking release control fluid pressure chamber;

a fluid pressure source;

a fluid pressure control mechanism for controlling a fluid pressure generated by the fluid pressure source ~~[[so]]~~ such that the parking control fluid pressure and the parking release control fluid pressure ~~can be~~ are obtained and separately controlled;

and a brake caliper having an adjustment mechanism provided therein, said brake caliper having a brake fluid pressure chamber formed therein, a brake piston being slidably fitted into a cylinder hole of the brake caliper and having a rear face facing the brake fluid pressure chamber,

the adjustment mechanism comprising:

an adjustment nut connected to the brake piston ~~[[so]]~~ such that relative rotation thereof is not possible and housed in the brake fluid pressure chamber, an adjustment bolt having a front end part screwed into the adjustment nut, a relay piston disposed in a rear part of the brake fluid pressure chamber and slidably fitted into the brake caliper in a liquid-tight manner ~~[[so]]~~ such that the relay piston cannot rotate around the axis but ~~[[can]]~~ moves in the axial direction, and a small piston integrally and coaxially connected to a rear part of the adjustment bolt, slidably fitted into the relay piston in a liquid-tight manner, and resiliently urged in a direction in which the small piston frictionally engages with the relay piston, the parking piston abutting against the relay piston from the rear side and being slidably fitted into the casing connected to the brake caliper and the lock mechanism being provided within the casing to the rear side of the parking piston.

REMARKS AND DISCUSSION

Upon entry of the present amendment, Claims 1-4 remain in the application, of which, Claims 1, 2 and 4 are independent. Claims 1-4 have been amended by the present amendment.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment C is submitted. It is contended that by the present amendment, all bases of rejection set forth in the Office Action have been traversed and overcome. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

Interview with the Examiner

Applicant thanks the Examiner for the helpful and courteous telephonic interview she conducted with applicant's representative on October 29, 2010, in conjunction with Office Action of July 29, 2010. Prior to conducting the interview, applicant's representative sent, via facsimile, a draft of proposed claim amendments to the Examiner, and requested the Examiner to review the same.

During the interview, that Examiner informed applicant's representative she has reviewed the draft of proposed claim amendments. The Examiner also informed that the proposed claim amendments overcome the 112 issues set forth in the Office Action. As discussed herein, and as suggested by the Examiner, two terminal disclaimers are being submitted with this amendment to obviate the double patenting rejections set forth in the Office Action . Accordingly, since there are no any other issues to be resolved, all pending claims 1-4 are believed to be in condition for

allowance, and the present amendment is believed to place the application in condition for allowance.

Amendments Presented

In the Claims: applicant has amended each of claims 1-4 in an effort to overcome the 112 issues.

Applicant respectfully submits that all of the above amendments are fully supported by the original application. Applicant also respectfully submits that the above amendments do not introduce any new matter into the application, since all of the subject matter thereof was expressly or inherently disclosed in the original specification, claims and drawings.

Claim Rejections – 35 USC 112

In the Office Action (page 2, item 3), the Examiner rejected claims 1-4 under 35 USC §112, second paragraph. It is the Examiner's position that in claims 1-4, terms such as "can be", "so as", "can", "so that", "be able to be" are considered to be indefinite, since in the Examiner's view, such terms do not positively claim the features of the present invention.

Applicant's Response:

As stated above, applicant has amended claims 1-4, herein. Upon careful consideration and in light of the above amendments, applicant respectfully traverses such rejection and submits that the rejection is overcome. Applicant respectfully submits that each of claims 1-4, as amended, clearly and specifically defines the claimed invention, and that each and every claim term now

positively claims the features of the present invention.

For all of the foregoing reasons, applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-4 under 35 USC §112, second paragraph.

Claim Rejections – Double Patenting

1. In the Office Action (page 3, item 5), the Examiner rejected claims 1 and 2 on the grounds of nonstatutory obviousness-type double patenting as unpatentable over claim 1 of US Patent 7,651,175. According to the Examiner's interpretation, although the conflicting claims are not identical, they are not patentably distinct from each other, because in the Examiner's view, claim 1 of US Patent 7,651,175 encompasses claims 1 and 2 of the present application.

2. Also in the Office Action (page 3, item 6), the Examiner provisionally rejected claims 1 and 2 on the grounds of nonstatutory obviousness-type double patenting as unpatentable over claim 1 of the co-pending US Application 10/593,190. According to the Examiner's interpretation, although the conflicting claims are not identical, they are not patentably distinct from each other, since in the Examiner's view, claim 1 of the US Application 10/593,190 encompasses claims 1 and 2 of the present application.

Applicant's Response:

Although, respectfully disagrees with the Examiner's such double patenting rejection, applicant respectfully submits a terminal disclaimer to obviate a double patenting rejection over a "prior" patent, US 7,651,175, and also submits another terminal disclaimer to obviate a provisional

double patenting rejection over a pending “reference” application, USSN 10/593,190.

Based on the foregoing, applicant respectfully submits that the Examiner’s double-patenting rejections have been overcome. As such, applicant respectfully requests that such rejection be reconsidered and withdrawn.

Allowable Subject Matter

In the Office Action (page 3, item 7), the Examiner indicated that claims 1-4 would be allowable if rewritten (amended) to overcome the rejections under 35 USC §112, second paragraph, and double patenting rejection set forth in the Office Action.

Applicant’s Response:

Applicant gratefully acknowledges the Examiner’s indication that claims 1-4 include allowable subject matter. As discussed above, applicant has amended each of claims 1-4 to overcome the 112 issues. Also, as discussed above, two terminal disclaimers are being concurrently filed with this amendment to overcome the double patenting rejections set forth in the Office Action. Accordingly, claims 1-4 are believed to be in condition for allowance.

Conclusion

Applicant respectfully suggests that as presently amended, all of the pending claims are in condition for allowance. It is applicant's contention that no possible reading of the references, either singly or in any reasonable combination, can be viewed as either teaching applicant's claimed invention, or rendering applicant’s invention obvious.

For all of the above mentioned reasons, applicant requests reconsideration and withdrawal of all rejections of record, and allowance of the pending claims.

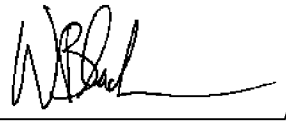
Entry of the present Amendment-C is respectfully requested under 37 CFR 1.116 on the grounds that: the amendment does not raise any new issues for consideration by the Examiner, but instead merely amends the claims to adopt the Examiner's suggestions in order to overcome the indefiniteness rejection, outlined in the Office Action of July 29, 2010, and includes two terminal disclaimers to obviate double patenting rejections, outlined in the Office Action, and therefore, the present amendment is believed to place the application in condition for allowance.

If the Examiner is not fully convinced of the allowability all of the claims now in the application, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

Favorable consideration is respectfully requested.

Respectfully submitted,


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I hereby certify that this correspondence is being electronically transmitted, via EFS-Web, to the United States Patent and Trademark Office, on October 29, 2010.



Fulchand P. Shende